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Virginia's Watery Wonderlands

by Glenda C. Booth

When Colonel William Byrd II surveyed eastern Virginia in 1728, he named the then one-million-acre wetland near today's Suffolk the Dismal Swamp, which signified an alliance with Satan. He wrote, "The foul damps ascent without ceasing, corrupt the air, and render it unfit for respiration." In the 1800s, the freshwater tidal wetland just south of Alexandria, today's Dyke Marsh, was called Hell Hole.

For many years, wetlands were the unwanted stepchild of nature, seen as murky, inhospitable, mosquito-ridden wastelands, stagnant holes of muck permeated by dense, dank air. Viewed as "useless" to humans, they often became dumps, sewage lagoons, or places to fill, drain, or "reclaim."

A wetland can be called a marsh, swamp, bog, fen, pocosin, vernal pool, or mudflat, among other terms. Wetlands are a transition zone between water and land and are often, but not always, wet. "In some cases, it will not be immediately obvious that a wetland exists," states the Virginia Department of Environmental Quality (DEQ) website. Here is DEQ's definition:

'Wetland' means those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. An area is considered a wetland in Virginia if it exhibits wetland *hydrology*, hydric *soils,* and a prevalence of wetland *vegetation*.

Each wetland type is a combination of soil, hydrology, vegetation, and other characteristics. These "biological supermarkets" are among the most productive habitats on Earth. "In an area roughly the size of an average desk top, there can be as many as 8,300 animals," says Kirk Havens, who directs the Coastal Watersheds Program at the Virginia Institute of Marine Science (VIMS).

And from the Virginia Marine Resources Commission (VMRC): "Marine resources are finite, provide many valuable services and products, and are delicately balanced in an intricate web of biological and physical interactions. Permanent loss of these resources and unnecessary alterations jeopardize this delicate ecological balance."

Wetlands cover around five percent of the country's land surface but are home to 31 percent of plant species and more than one-third of threatened and endangered species. Of Virginia's wetlands, about 75 percent are nontidal, found primarily in bottomlands and the floodplains along stream channels. By contrast, tidal wetlands are distributed along the state's 5,000 miles of shoreline, lined with marshes, beaches, and mudflats. Around 75 percent of all wetlands in the state are privately owned.

Free Ecological Services

Wetlands provide many ecological services—for free. Called "nature's kidneys," they enhance water quality by filtering out pollutants. They also help stabilize shorelines, attenuate tidal energy, stem erosion, and control flooding by trapping and slowly releasing water like a sponge. And, well known by outdoorsmen, wetlands offer aesthetic and recreational opportunities—from waterfowl hunting to frog watching.

"Wetlands are critical waterfowl habitat," notes the website of Ducks Unlimited. "Every species of duck, goose, and swan in North America depends on wetland habitat throughout their life cycle."

Many fish raise their young here. "Wetlands provide an essential link in the life cycle of 75 percent of the fish and shellfish commercially harvested in the U.S., and up to 90 percent of the recreational fish catch," reports the U.S. Environmental Protection Agency (EPA). Because of these myriad natural services, wetlands have tremendous economic value, with one estimate by the EPA at $14.9 trillion worldwide.

Wetlands Lost

Since colonial times, the contiguous United States has lost around 53 percent of its wetlands, having dropped from 221 million acres in the early 1600s to just over 110 million in 2009, the most recent data available. Around 40 to 45 percent of Virginia's wetlands have vanished during that period.

"Wetlands are at a tipping point," U.S. Interior Department Secretary Ken Salazar has said. "While we have made great strides in conserving and restoring wetlands since the 1950s, when we were losing an area equal to half the size of Rhode Island each year, we remain on a downward trend that is alarming."

A 2009 U.S. Fish & Wildlife Service report reveals an annual loss of 59,000 acres of wetlands in the coastal watersheds of the Atlantic, Gulf of Mexico, and Great Lakes from 1998 to 2004. An estimated 18 percent of these losses occurred in tidal salt marshes, and the remaining 82 percent occurred in upland marshes and forested wetlands of the watersheds. These numbers "… underscore the importance of moving quickly to protect, conserve, and restore these vital coastal areas before they are lost forever," stresses Salazar.

Wetland loss is concentrated in coastal watersheds due to the large number of people living in and moving to coastal areas. More than half of the American population now lives in coastal counties at densities approximately five times greater than inland counties, according to the Fish & Wildlife Service.

Threats to Wetlands

Land-use practices, chiefly development of many kinds, represent a major threat to wetlands. "Human activities cause wetland degradation and loss by changing water quality, quantity, and flow rates, increasing pollutant

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Yellow perch are among the many fish that thrive when wetlands, and water quality, are protected.

inputs; and changing species composition as a result of disturbance and the introduction of nonnative species," states EPA's website. Common activities that can harm wetlands include depositing fill, draining for development or farming, channelizing streams, diking, damming, and expanding impervious surfaces, which increase pollution.

Another threat, nonnative plants like purple loosestrife *(Lythrum salicaria)* and phragmites *(Phragmites australis)* introduced to these ecosystems often out-compete and destroy native wetland plants and thereby lower biodiversity.

Carl Hershner, director of the Center for Coastal Resources Management at VIMS, predicts that sea level rise will be between one and two feet over the next 50 years along Virginia's coast. That matches a similar estimate by the 2009 Virginia Commission on Climate Change of a 2.3 to 5.2 feet rise per century. At that rate, the state could lose between 50 and 80 percent of its tidal wetlands, cautions Skip Stiles of Wetlands Watch, a commissioner. The commission's predicted rate of rise "is a death sentence to the low-lying shorelines, dunes, and wetlands found within a few feet of sea level," says Stiles.

"A healthy tidal wetland accumulates enough plant material and sediment to move vertically, but our wetlands are under stress, limiting their elevation. With a two-foot-plus rise, wetlands that can't keep up must retreat into upland areas. And when those upland areas are built out, bulkheaded, or hardened, that retreat is blocked and the wetlands will drown in place," he maintains.

The commission urged that the state develop a Sea Level Rise Adaptation Strategy and recommended that local governments in coastal areas include climate change impacts—

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The white hibiscus plant, left, and wild rice and arrow arum above indicate a healthy freshwater wetland.

RESOURCES

* Wetlands Functions and Values:
  www.epa.gov/owow/wetlands/pdf/fun_val.pdf and
  http://water.usgs.gov/nwsum/WSP2425/functions.html
* Wetlands and Stream Protection:
  www.deq.virginia.gov/Programs/Water/WetlandsStreams.aspx
* Conserving Habitat for Waterfowl:
  www.ducks.org/conservation/how-we-conserve/conservation-priority-areas
* Living Shorelines:
  http://ccrm.vims.edu/livingshorelines/index.html or
  www.cbf.org/Document.Doc?id=60
* Wetlands Regulation and Advocacy: www.wetlandswatch.org

especially sea level rise and storm surge—in land-use plans, ordinances, and shoreline management plans.

Wetlands Permits

Virginia issues permits for certain activities in wetlands through two programs: the Virginia Water Protection Program, administered by DEQ, and the Tidal Wetlands Program, managed by VMRC and local wetlands boards. Generally, in Virginia, a permit is required for wetland-disturbing activities like dredging, filling, or altering.

To stabilize tidal shorelines, Virginia's policies are increasingly discouraging the use of hard structures like riprap revetments (of rock), bulkheads, and sea walls in wetlands and instead encouraging what are called "living shorelines" where they can be effective. Living shorelines are non-structural approaches that include plants, stone, sand fill, and bioengineered materials. Such methods seek to support natural processes and not sever the connections between uplands and aquatic areas. Living shorelines aim to maintain the benefits to wildlife and water quality that a natural shoreline provides.

In a progressive move in 2011, Virginia declared as policy that the state prefers living shorelines to stabilize shoreline erosion in tidal wetlands. VMRC is implementing this law and local governments are required to include coastal resources management in their comprehensive plans. VIMS is currently preparing guidance for Tidewater localities that will offer an ecosystem-based approach to managing coastal resources.

Wetlands Compensation and Mitigation

The commonwealth has committed to "no net loss" of wetlands. DEQ's website states that "…wetlands that are lost or destroyed by development activities, such as building, must be replaced so that the overall amount of wetland acreage does not decline." The person causing the impact may be required to create, restore, or enhance wetlands through what is called compensatory mitigation. This generally can be accomplished through restoration, creation, purchase of mitigation bank credits, or contribution of an in-lieu fee.

Virginia committed to a net gain of 10,000 acres of wetlands by 2010 and to restoring 6,000 new acres of wetlands within the Chesapeake Bay watershed by June 2010, as part of the 2000 Chesapeake Bay Agreement. While not quite there, the good news is that DEQ has tracked a net gain of 7,191 acres of nontidal wetlands and a net gain of 1,473 new acres of tidal and nontidal wetlands between 2001 and 2011, according to Dave Davis, director of DEQ's Office of Wetlands and Stream Protection. In the Chesapeake Bay watershed, Virginia has restored 1,564 acres since 1998, reports the Chesapeake Bay Program. This is important because about half of the state is drained by Chesapeake Bay rivers. The DEQ numbers do not reflect all wetlands created or restored in Virginia, Davis cautions.

Significant wetland areas have been improved through funds provided by Duck Stamp sales; others have been protected by this Department through the acquisition of wildlife management areas (WMAs). Recent examples include the 2,500-acre Mattaponi WMA in Caroline County and the 300-acre Merrimac Farm WMA in Prince William County. And through a generous grant from the National Coastal Wetlands Conservation Grant Program and partnership with the City of Virginia Beach, DGIF holds a conservation easement at Pleasure House Point overlooking Lynnhaven Bay. More than 80 acres of tidal wetlands and maritime forest important to the ecological productivity of the Lynnhaven River system are now protected from future development.

Think Positively

In *The Hound of the Baskervilles*, Sir Arthur Conan Doyle called the wetland where the villain met his fate a "dark, quivering mire" of "miasmatic vapor" and "slimy water plants." Today, thankfully, wetlands have a new image.

If you think wetlands, think Monet's water lilies, delicately swirling dragonflies, shimmering minnows, or newborn wood ducks catapulting into a wetland for the first time. Indeed, wetlands are rich biological laboratories of life.

Glenda C Booth, a freelance writer, grew up in Southwest Virginia and has lived in Northern Virginia over 30 years, where she is active in conservation efforts.

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This grassy marsh along the lower James River attracts a host of ducks and small mammals, and is an important nursery area for fish and birds.